YNWS *MILLENNIUM*™ WATER COOLED CHILLER

YNRS *MILLENNIUM*™ REMOTE CONDENSER CHILLER

R717 REFRIGERANT

COOLING CAPACITIES 472 KW TO 1760 KW

York Water Cooled Chillers (YNWS) and Remote Condenser Chillers (YNRS) are a compact design suitable for chilled water or water/glycol cooling. They are designed to be located inside a plant room.

YNWS Chillers require a cooling tower or dry cooler for heat rejection.

YNRS Chillers require an air cooled or evaporative condenser for heat rejection.

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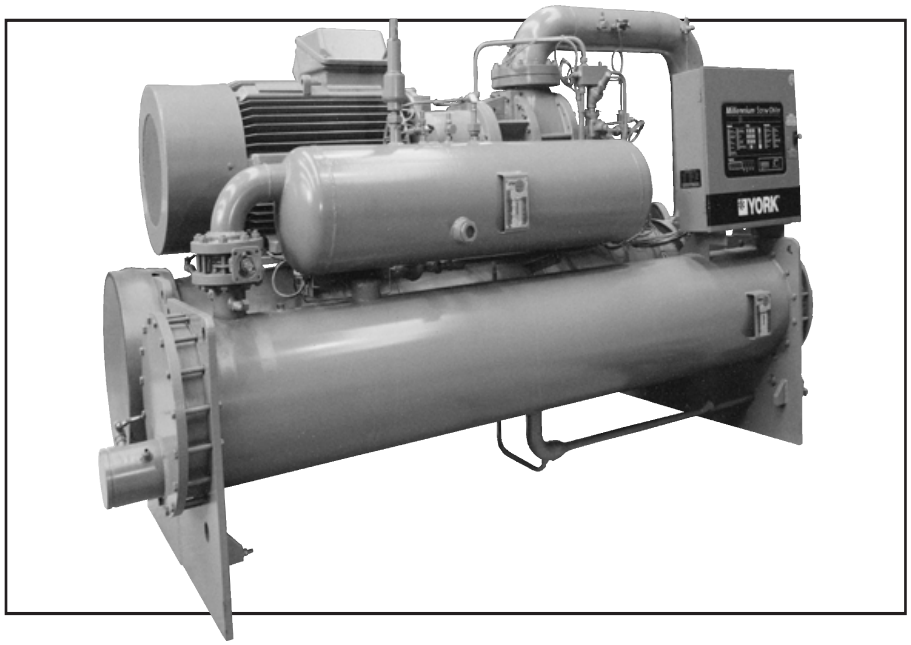


AVAILABLE MODELS & NOMINAL COOLING CAPACITIES TABLE 1

MODEL	COOL. kW	SHAFT kW	MODEL	COOL. kW	SHAFT kW	MODEL	COOL. kW	SHAFT kW
YNWS 717 DC FC S0	472	98	**YNWS 717 FC HC S3**	1061	227	**YNRS 717 DC S0**	457	117
YNWS 717 DC GC S0	474	95	**YNWS 717 FC JC S3**	1065	222	**YNRS 717 EC S0**	486	117
YNWS 717 EC FC S0	502	98	**YNWS 717 FC KC S3**	1070	214	**YNRS 717 DC S1**	545	148
YNWS 717 EC GC S0	505	95	**YNWS 717 FC KC S4**	1366	285	**YNRS 717 EC S1**	599	148
YNWS 717 DC FC S1	560	127	**YNWS 717 FC LC S4**	1371	277	**YNRS 717 EC S2**	772	194
YNWS 717 DC GC S1	563	123	**YNWS 717 FC MC S4**	1374	274	**YNRS 717 FC S2**	815	193
YNWS 717 EC FC S1	614	128	**YNWS 717 FC NC S4**	1377	269	**YNRS 717 EC S3**	978	259
YNWS 717 EC GC S1	618	123	**YNWS 717 GC KC S4**	1444	286	**YNRS 717 FC S3**	1040	259
YNWS 717 EC GC S2	789	168	**YNWS 717 GC LC S4**	1450	278	**YNRS 717 FC S4**	1337	328
YNWS 717 EC HC S2	794	162	**YNWS 717 GC MC S4**	1452	274	**YNRS 717 GC S4**	1414	327
YNWS 717 EC JC S2	796	159	**YNWS 717 GC NC S4**	1457	269	**YNRS 717 FC S5**	1588	414
YNWS 717 FC GC S2	832	169	**YNWS 717 FC LC S5**	1636	361	**YNRS 717 GC S5**	1715	413
YNWS 717 FC HC S2	837	162	**YNWS 717 FC MC S5**	1639	356			
YNWS 717 FC JC S2	839	159	**YNWS 717 FC NC S5**	1643	348			
YNWS 717 EC HC S3	991	226	**YNWS 717 GC LC S5**	1750	363			
YNWS 717 EC JC S3	994	221	**YNWS 717 GC MC S5**	1753	358			
YNWS 717 EC KC S3	998	214	**YNWS 717 GC NC S5**	1760	349			

YNWS Cooling Capacities at 6°C leaving Chilled Water and 32°C leaving Condenser Water
YNRS Cooling Capacities at 6°C leaving Chilled Water and 42°C Condensing Temperature

FEATURES	BENEFITS
Factory certified to EN/ISO 9001.	High standard of quality control.
High full load and part load efficiency.	Low operating costs at all load conditions.
Operates at low condenser water temperatures (YNWS). Cooling Tower bypass not required.	Reduced energy costs during winter and capital cost savings.
Open drive motor.	More efficient than refrigerant cooled motor.
Mixed-matched components.	Satisfies exact capacity/energy requirements.
Industrial type screw compressor.	Long life reliability.
Refrigerant R717.	Zero ozone depletion value. Zero global warming impact.
Microprocessor control with visual display of temperatures, pressures, slide valve position, motor current, operating hours and number of starts.	System data logging and temperature reset capability. Fault diagnostics. Energy management.
Unit remote alarm contacts.	Warning notification.
Optional remote water temperature and current limit reset.	To improve operating efficiency.
Building Management Interface.	For central data logging and single point system monitoring and control.
Small ammonia charge.	Safe use.
CE Mark.	For all European Market.

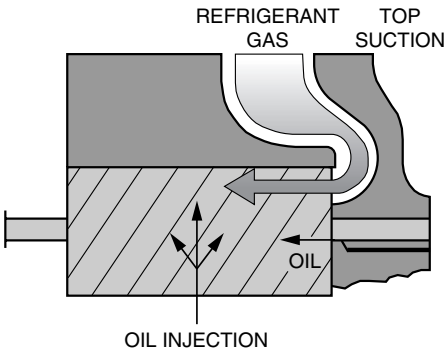
York Millennium Rotary Screw Compressor Chillers are computer selected to custom-match individual building load and energy requirements.

Matched Components Maximize Efficiency
A large number of standard heat exchangers and pass arrangements, as well as compressor and motor options, are available to provide a component combination that can achieve the required capacity and lowest full and part load energy consumption at the specified operating conditions.

Screw Compressor Reliability
The rotary screw compressor is designed and manufactured by the York company "Frick" and has a proven dependability in thousands of demanding industrial refrigeration and gas compression applications since the early 1980's. the York-Frick combination has been applied to air conditioning systems worldwide.

Superior Low Load Capability
The Millennium chiller can operate easily and efficiently from 100% capacity to 10%. The key is a compressor design which prevents oil from leaking into suction line, regardless of refrigerant gas velocity.
Most screw compressors cannot unload below 25% to 30% of full load capacity, seriously impairing their low load efficiency. These designs utilise bottom suction inlets and require a high refrigerant gas velocity to prevent oil from dropping into the cooler.

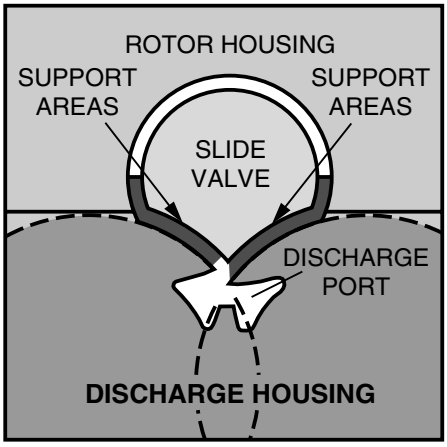
FIGURE 1



The Millennium rotary screw compressor offers a greater unloading range because oil cannot drop into the cooler at low loads.

Slide-Valve Design Reduces Wear
The method used to support the capacity-controlling slide valve of a screw compressor can have an important impact on reliability. The Frick compressor has a slide valve built long enough to extend beyond the rotor housing, where the discharge housing supports the valve from underneath. This design means that the valve is kept within a very close tolerance with the spinning rotors, yet never allowed to touch them.

FIGURE 2



The York slide valve extends beyond the rotor housing to where the discharge housing can support the valve from underneath, providing secure positioning and close tolerances.

Oil Management System
Screw compressors use oil to seal the meshing rotors for efficient compression and to cool the mating parts. Much of this oil becomes entrained in the refrigerant gas. If it is not removed, it will become trapped in the heat exchangers, robbing the compressor of critical lubrication and wasting energy.
The Millennium screw chiller uses a time-proven two-stage oil separator, removing the oil by gravity dropout and by mesh eliminators.

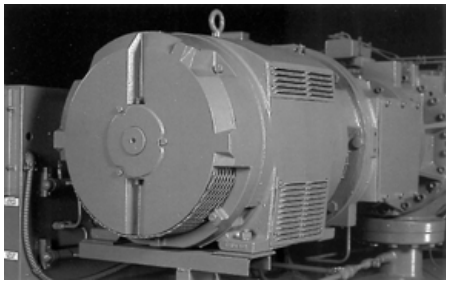
Oil Reservoir Positioned for Constant Lubrication
A compressor must have adequate lubrication during start-up and shutdown, or it may seize. Less advanced designs depend only on residual oil clinging to compressor surfaces to provide lubrication. The Frick screw compressor leaves nothing to chance. An oil reservoir located at rotor-bearing level ensures proper lubrication during start-up and shutdown.

Open Drive Motor Benefits
The compressor drive-line has a close coupled open drive air cooled electric motor.

More Efficient than Hermetic Motor
The Millennium close coupled open drive design reduces energy consumption by 3% to 6% compared to a semi-hermetic refrigerant cooled motor. Air cooled motors eliminate heat rejection into the chiller system providing the same cooling capacity for less motor power. Air offers less resistance to motor rotation than refrigerant resulting in higher operating efficiency.

Motor Burn-out Problems solved with Open Drive
Hermetic motor burn-out can cause serious damage to a chiller, due to the system contamination by motor winding debris. The entire chiller has to be cleaned and the refrigerant replaced. The motor usually has to be returned to the factory for repair. This risk is eliminated by using air cooled motors, which have no direct connection to the refrigerant system and being of standard design, can be rewound locally.

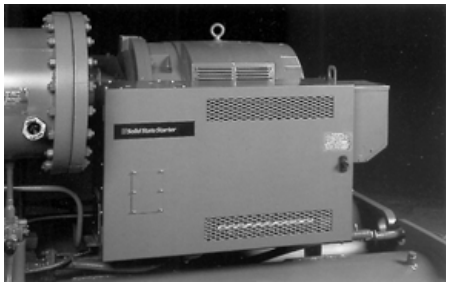
FIGURE 3



Reliable YORK open-drive motor design eliminates the possibility of a hermetic motor burn-out, a catastrophic failure which may contaminate an entire chiller system.

Electronic Starting - Smooth and Reliable
The electronic design of the optional YORK Solid-State Starter provides the most reliable motor starting system available today. Compare this to old-fashioned electro-mechanical starters, with mechanical contactors and linkages that corrode or weld together.
The Solid-State Starter also improves chiller reliability. By "soft starting" the motor, it minimizes the damaging effects of sudden current inrush on the motor/compressor driveline.

FIGURE 4



The YORK Solid-State Starter provides efficient, reliable motor operation.

Take Advantage of Colder Cooling Tower Water
YORK Millennium chillers have been designed to take full advantage of colder cooling-tower water temperatures which are naturally available during off-peak hours. Considerable energy savings are available by allowing the tower water temperature to drop, rather than artificially holding it at 20 to 24°C as required by some chillers.

SPECIFICATION

General
The YORK Millennium Rotary Screw Chiller is completely factory packaged including cooler, condenser, oil separator, compressor, motor, lubrication system, ISN Millennium Control Centre, and all interconnecting unit piping and wiring. The unit is supplied with nitrogen gas pressure. Ammonia and miscible oil charge is supplied in container.

Compressor
The rotary twin screw compressor has been engineered and constructed to meet the exacting requirements of the industrial refrigeration market. It utilizes state-of-the-art technology to provide the most reliable and energy efficient compressor available at all operating conditions. The compressor operates at 2975 rpm. The compressor housing is made of cast iron, precision machined to provide minimal clearance for the rotors.

The rotors are manufactured from forged steel and use asymmetric profiles. The compressor incorporates a complete anti-friction bearing design for reduced power and increased reliability. Four separate cylindrical roller bearings handle radial loads. Two 4-point angular contact ball bearings handle axial loads. Together they maintain accurate rotor positioning at all pressure ratios thereby minimizing blow-by and maintaining efficiency.

A non return valve is installed in the compressor discharge housing (between compressor and oil separator for S4 and S5 compressor) to prevent compressor rotor backspin due to system refrigerant pressure gradients during shutdown.

The open-drive compressor shaft seal consists of a spring loaded, precision carbon ring, high temperature elastomer "O" ring static seal, and stress-relieved, precision lapped collars. The entire shaft seal cavity is at low pressure, being vented to the oil drain from the compressor. Combining low pressure with direct oil cooling provides long seal life.

Capacity Control
Capacity control is achieved by use of a slide valve which provides fully modulating control from 100% to 10% of full load. The slide valve is actuated by oil pressure controlled by external solenoid valves via the ISN Millennium Control Centre.

Motor Driveline
The compressor motor is an open drip-proof, squirrel cage, type constructed to YORK design specifications. 50 hertz motors operate at 2975 rpm. The open motor is provided with a D-flange, factory mounted to a cast iron adaptor mounted on the compressor. This unique design allows the motor to be rigidly coupled to the compressor to provide factory alignment of motor and compressor shafts.

The motor drive shaft is directly connected to the compressor shaft with a flexible disc coupling. The coupling is of all metal construction with no wearing parts to assure long life, and no lubrication requirements to provide low maintenance.

For units utilizing remote electro-mechanical starters, a steel terminal box is provided for field connected conduit. There are six terminals (three for high voltage) brought through the motor casing into the terminal box. Jumpers are supplied for three-lead types of starting. Motor terminal lugs are supplied. Overload/overcurrent transformers are supplied with all units. For units supplied with factory packaged Solid State Starters, refer to the Accessories and Options Section.

Oil Separator
The oil separator is a horizontal design with no moving parts. Effective oil separation is achieved by gravity dropout of oil from the refrigerant gas as velocity decreases upon entering the separator, and by mesh pads to provide final gas/oil separation before gas enters the condenser. The oil separator is designed for 24 bar g design working pressure. Each vessel has a refrigerant relief device(s) set at 24 bar g.

Lubrication
The main oil reservoir is located in the oil separator. The compressor also has an oil reservoir located at the rotor bearings to provide lubrication during start-up, coastdown and in the event of a power failure. During operation, system pressure differential provides proper oil flow without the need of an oil pump. This minimizes system energy consumption.

A 250 watt (115 volt - 1 phase- 50Hz) immersion oil heater is located in the oil separator reservoir, temperature actuated to effectively remove refrigerant from the oil. Power wiring is provided to the control centre. An external, replaceable cartridge, 15 micron oil filter is provided with manual isolation stop valves for ease of servicing.

Heat Exchangers
Shells - Cooler and condenser (YNWS models) shells are fabricated from rolled carbon steel plates. Carbon steel tube sheets, drilled and reamed to accommodate the tubes, are welded to the end of each shell. Intermediate tube supports are fabricated of carbon steel plates.
Tubes - Tubes are state-of-the-art, high efficiency, steel finned and internally enhanced type (3/4" BWG 20) for cooler, stainless steel plain tubes (3/4" BWG 22) for condenser (YNWS only) to provide optimum performance. Each tube is roller expanded into the tube sheets providing a leak-proof seal, and are individually replaceable.
Cooler - Cooler is a shell and tube, DX type heat exchanger. A distributor throttle provides uniform distribution of refrigerant on tubes to yield optimum heat transfer. A refrigerant charging valve is provided. The refrigerant side of each cooler is designed for 15 bar g design working pressure, tested at 30 bar g.
Condenser (YNWS only) - The condenser is a shell and tube type, with a discharge gas baffle to prevent direct high velocity impingement on the tubes. This baffle is also used to distribute the refrigerant gas flow properly for most efficient heat transfer. The refrigerant side of each shell is designed for 24 bar g design working pressure tested at 48 bar g.
Compact Water Boxes - Removable water boxes are fabricated of steel. The design working pressure is 10 bar g and the boxes are tested at 15 bar g. Integral steel water baffles are located and welded within the water box to provide required pass arrangements. Stub-out water nozzle connections with victaulic grooves are welded to the water boxes. These nozzle connections are suitable for Victaulic couplings, welding or flanges, nozzles are capped for shipment. Plugged 3/4" drain and vent connections are provided in each cooler water box.

Liquid Receiver (YNRS only)
Factory fitted liquid receiver complete with relief valve and level glass. All standard liquid line components are included between the receiver and cooler.

Refrigerant Flow Control
Refrigerant flow to the cooler is controlled by a mechanical expansion valve to provide 4°C superheating for 100% to 10% of capacity.

SPECIFICATION (Continued)

Refrigerant Isolation
The condenser shell (YNWS) or liquid receiver (YNRS) serves as a refrigerant receiver to store the system charge during servicing. Manually operated isolation valves are located at the inlet and outlet of the condenser or liquid receiver. Valves are also provided to facilitate removal of the refrigerant from the system should that be necessary.

ISN Millennium Control Centre
The ISN Millennium Control Centre is factory mounted, wired and tested. The electronic panel automatically controls the operation of the unit in meeting system cooling requirements while minimizing energy usage. Chiller operating parameters are sensed by either thermistors or transducers and displayed on the keypad. The control centre is fused through a 1-1/2 kVA transformer in the compressor motor starter.

Isolation Mounting
The unit is provided with four vibration isolation mounts consisting of 25 mm thick neoprene isolation pads for field mounting under the steel mounting pads located on the tube sheets. Suitable for ground floor installations.

Paint
Exterior surfaces are protected with Caribbean blue machinery paint.

Shipment
Protective covering film is supplied on the unit water nozzles are capped with fitted plastic enclosures.

ACCESSORIES AND OPTIONS

High Voltage Motor
3300 volt high voltage motor instead of standard low voltage. Suitable for three lead type starting only. Star delta not available. This option increase the unit height. Please contact factory.

Anti-Vibration Mounts
Spring type vibration isolators, required on all upper floor locations, instead of neoprene isolation pads supplied as standard.

Flow Switch
Paddle-type vapour-proof water flow switches suitable for 10 bar g DWP for chilled and condenser water circuits, switch for 115V-1-50 service. A chilled water flow switch is required. Condenser water flow switch is optional (YNWS only).

Cooler Insulation
Factory applied anti-sweat flexible closed cell plastic type insulation, 19 mm thick, fixed with vapour-proof cement to cooler, liquid lines, suction lines and as necessary to auxiliary tubing. Does not include insulation of water nozzles. Normally prevents sweating in environments of 75% RH and temperatures between 10°C and 32°C. 38 mm insulation is available for 90% RH conditions.
Note: It is difficult to insulate the underside of the chiller when installed.

Factory Welded Flanges
Factory welded on cooler and condenser (YNWS only) connections, without companion flange. Flange PN 10 ISO type 1 NFE 29.203.

Marine Water Boxes on Condenser (YNWS only)
Removable bolted water boxes, instead of standard compact boxes, at nozzle end only.

Shipping Skids
Unit shipped on two wood skids. Height increase 150 mm. Weight increase 135 kg.

Remote Interface Option Boards (only with ISN Control Panel)
Allows remote reset of temperature set point and current limit. Boards accept 4-20 mA or 0-10 V control signals. Field installed.

Solid State Starter (only with ISN Control Panel)
Water cooled factory mounted starter. Reduced voltage, soft start. Controlled inrush maintains motor current at a constant level throughout the acceleration period using six silicon controlled rectifiers.

Pressure Vessel Codes
Pressure Vessels can be supplied in conformance with the following codes:
DRIRE (France)
T.U.V. (Germany & Austria)
I.S.P.E.S.L. (Italy)
ASME
SVDB (Switzerland)
SA (Sweden).

High Protection Motor
IP 54 protection motor instead of standard IP 23 protection.

Siemens Control Panel
SIEMENS 95 U microprocessor with OP07 or OP35/37 operating display instead of ISN control panel.

Gauge Kit
3 pressures gauge (Suction, Discharge and, Oil) added to the control system.

Dual Oil Filter

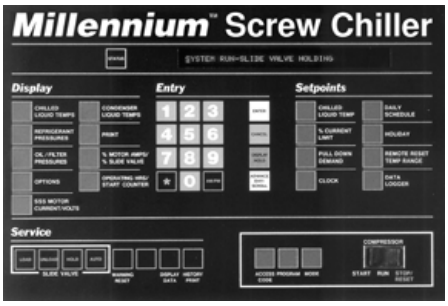
Suction Valve
One suction valve on the compressor suction pipe.

Factory Running Test

Factory Performance Test
(Norm NF E35.201 & ISO/R916:1968)

ISN *Millennium*™ CONTROL CENTRE

FIGURE 5



ISN Millennium Control centre

The ISN Millennium Control centre provides the ultimate in efficiency and chiller protection. State-of-the-art micro-electronics assure precise, reliable chiller control logic and safety annunciations. The control centre allows direct interfacing with the YORK Integrated Systems Network (ISN) building management system, allowing complete integration of chiller, airside, and building automation controls.

Microcomputer Control Centre
Other Building Management Systems can be interfaced by applying a YorkTalk translator.
A keypad, divided into distinct colour coded groups, according to function, provides easy access to all chiller control and monitoring functions. Essential set points that can be programmed include leaving chilled liquid temperature, electrical demand limit, and daily start/stop schedule.

Data Logging
All data required for accurate, detailed logs can be collected directly from the display or via a printer that can be connected to the panel. A printed log can be obtained automatically at predetermined time intervals without the need for the presence of an operator.

Advanced Warning of Problems
Changes in motor current, oil temperature and pressure, refrigerant pressures, or water temperatures can be valuable indicators of developing problems. This data gives you ample time to take corrective measures before any major expense or downtime occurs

Advanced Warning of Tube Fouling
No longer must an owner guess when water-side fouling begins to waste energy. The YORK Micro-Computer Control Centre provides readouts of saturated refrigerant temperatures. A simple review of the readings will indicate if tube cleaning is needed.

Trouble Shooting Diagnostics
Safety shutdown annunciations include information on day and time of shutdown, cause of shutdown, and type of restart required. Cause of shutdown is displayed eliminating time-consuming cross referencing and confusion. A software test button inside the Microcomputer Control centre allows you to verify the operational status of each electronic circuit board in the panel.

Schedule Routine Maintenance
With more information about chiller operation available, routine maintenance can be accurately scheduled well in advance of actual need. And with advanced information on the nature of the maintenance required, you can confidently schedule routine service whenever it's most convenient for day-to-day building operation.

Information Display
Vital chiller operating information can be shown on the 40-character alphanumeric display. All information is in plain language. Reference codes are not used. Information provided on all units as standard includes :

- Chilled liquid temperatures - entering and leaving
- Condenser liquid temperatures -entering and leaving (YNWS only)
- Refrigerant pressures - cooler and condenser
- Oil pressure - at compressor and oil filter differential
- Oil temperature
- % motor current
- % slide valve position
- Operating hours
- Number of compressor starts
- Saturation temperatures - cooler and condenser
- Discharge temperature
- Suction temperature - Superheating

Information provided as an option:
- Three phase motor current with Solid State Starter option
- Three phase motor voltage with solid State Starter option

In addition, all operating and setpoint information can be transmitted to an optional remote printer through the RS-232 port to obtain data logs:
- At any time by pressing PRINT button
- At set time intervals by programming the panel
- Record of time and cause of safety and cycling shutdowns with all operating information just prior to shutdown
- History printout of last four shutdowns

Precise Leaving Chilled Water Temperature Control
- Digital keypad entry of setpoint to 0.05°C
- Verify actual vs. setpoint temperature via alphanumeric display
- Remote reset capability standard with YORK ISN Building Automation system, optional for other analog or discreet remote signals.
- Adjustable remote reset range (up to 11°C) provides flexible, efficient use of remote signal depending on reset needs.

Thermal (ice) Storage Control Mode
Thermal ice storage systems are based on the concept of using off-peak, lower cost electricity to build ice for handling the cooling load during peak hours. The most efficient way to build ice is to maximize chiller load and minimize run time. Standard chiller control systems are not designed for this operating mode. In a typical application, chillers will load and unload to maintain a leaving chilled liquid setpoint.

When the YORK chiller operates in the thermal storage control mode, the unit will remain at 100% load until the setpoint shutdown temperature is reached. To add greater operating flexibility and eliminate unnecessary chiller cycling, two different Low Water (Liquid) Temperature Restart Thresholds can be programmed, one for the ice mode and one for the standard cooling mode.

This control enhancement is **standard** on all chillers. The chiller can also be left in the standard control mode for temperatures between -6,7 to 0°C, for applications involving a process cooling duty that requires leaving chilled liquid temperature setpoint control.

System Cycling Controls
- Programmable seven-day time clock for automatic start/stop of chiller, and cooler and condenser water pumps, and cooling tower.
- Separate schedule input strictly for holidays.
- Remote cycling contacts available for other field-supplied signals.

Motor Current Limiting Controls
- Programmable pulldown demand to automatically limit motor loading for minimizing building demand charges
- Pulldown time period control up to four hours.
- Verify time remaining in pulldown cycle from display readout.
- Separate digital setpoint for current limiting between 40 and 100%.
- Remote reset capability standard with YORK ISN Building Automation System, optional for other analog or discreet remote signals.

ISN *Millennium*™ CONTROL CENTRE (Continued)

System Shutdown Controls
The following safeties responsible for system shutdown are shown on the alphanumeric display. Each annunciation details the day, time, reason for shutdown and type of restart required. All shutdowns are sequenced by the micro board except as noted.

Cycling - those controls which automatically reset and permit auto restart of the system (as allowed by anti-recycle timers).

- Low water temperature as sensed through the LWT sensor. If a drop in water temperature occurs, the unit is stopped at 2.2°C below the chilled liquid temperature setpoint. On a rise in water temperature, the unit restarts automatically.
- Chilled water pump interlock or flow switch. Flow must be interrupted for a minimum of two seconds before shutdown will occur.
- Remote/local cycling devices (field supplied).
- Automatic restart after power failure (a jumper plug is supplied if automatic restart is desired).
- Multi-unit sequencing.
- Power fault relay.
- High and low line voltage with Solid State Starter option.

Safety - those controls which (when employed) require a manual operation to depress the STOP-RESET switch and then COMPRESSOR START to restart the system.

- High Compressor Discharge temperature
  - fixed cutout provided by thermistor sensor.
- High Oil Temperature
  - fixed cutout provided by thermistor sensor.
- Manual Restart after Power failure (jumper plug supplied if automatic restart is desired).
- High Oil Pressure or Low Oil Pressure
  - fixed cutout provided by differential between separate transducer readings from the compressor sump and bearing feed line.
- Low Cooler Pressure or High Condenser Pressure
  - to avoid nuisance cycling, the compressor capacity is held at cutout threshold for a safe period of time; if condition persists, a fixed cutout is provided by dedicated transducers.
- Clogged oil filter.
- Low oil level switch in oil separator.
- Remote stop (field-supplied signal).
- Differential between Leaving Chilled water and Cooler Saturation temperatures
  - fixed cutout when value falls outside specified range to detect faulty sensors.
- Motor Controller
  - fixed cutout provided by motor overloads (manual reset required of specific controller depending on starter type).

Control Mode Selection
There are three keys for the selection of the control centre modes :

- ACCESS CODE permits access to the microcomputer PROGRAM and MODE buttons.
- PROGRAM permits the operator to program the setpoints.
- MODE permits the operator to select the following control modes :
- LOCAL allows manual compressor start from the compressor switch located on the control centre.
- REMOTE allows remote start and stop of the compressor and remote reset of the chilled water temperature and current limit.
- SERVICE allows manual operation of the screw compressor slide valve, includes LOAD, UNLOAD HOLD and AUTO keys.

Field Interlocks-Chiller Status

- Remote mode ready to start - contact closure indicates that the panel is in REMOTE mode and that the unit will start (all safeties and cycling devices satisfied) when a remote start signal is received.
- Cycling shutdown - contact closure indicates that a cycling shutdown has occurred and that the unit will restart when the cycling control re-closes.
- Safety shutdown - contact closure indicates that a safety shutdown has occurred and that a manual reset is required to restart.
- Run contact - closure indicates that the panel is providing a run signal to the compressor motor starter.

APPLICATION DATA

Refrigerant Relief Piping
Each chiller is equipped with pressure relief device and the vent line must be connected to the outside of the building. This piping should include a flexible connection and a cleanable vertical-leg dirt trap to catch vent stack condensation.

Location
Chillers should be sited on a mounting pad which is level within 5 mm and capable of supporting the operating weight. Neoprene isolators, supplied as standard, are adequate for ground floor installations. For upper floor locations optional spring isolators are required. Sufficient clearance, around the unit, for normal service operations should be provided and additional space at one end of the unit for tube cleaning is required.

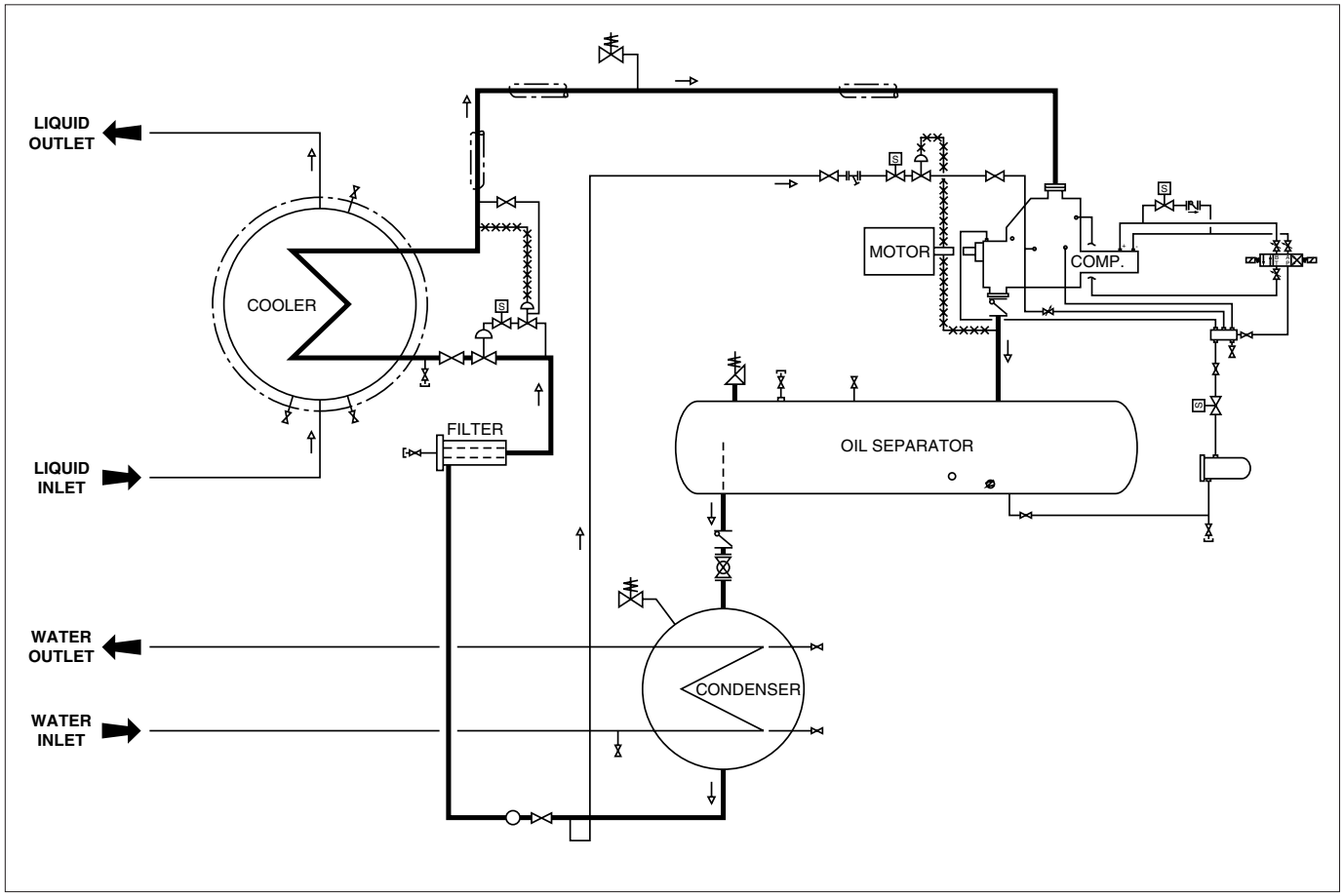
Ventilation
All mechanical refrigeration plant rooms should be vented to outside by one or more fans. Since the Millennium motor is air cooled ventilation should allow for the removal of heat from the motor.

Specific Regulation for Ammonia
Refer to the regulation in force in the setting up country.

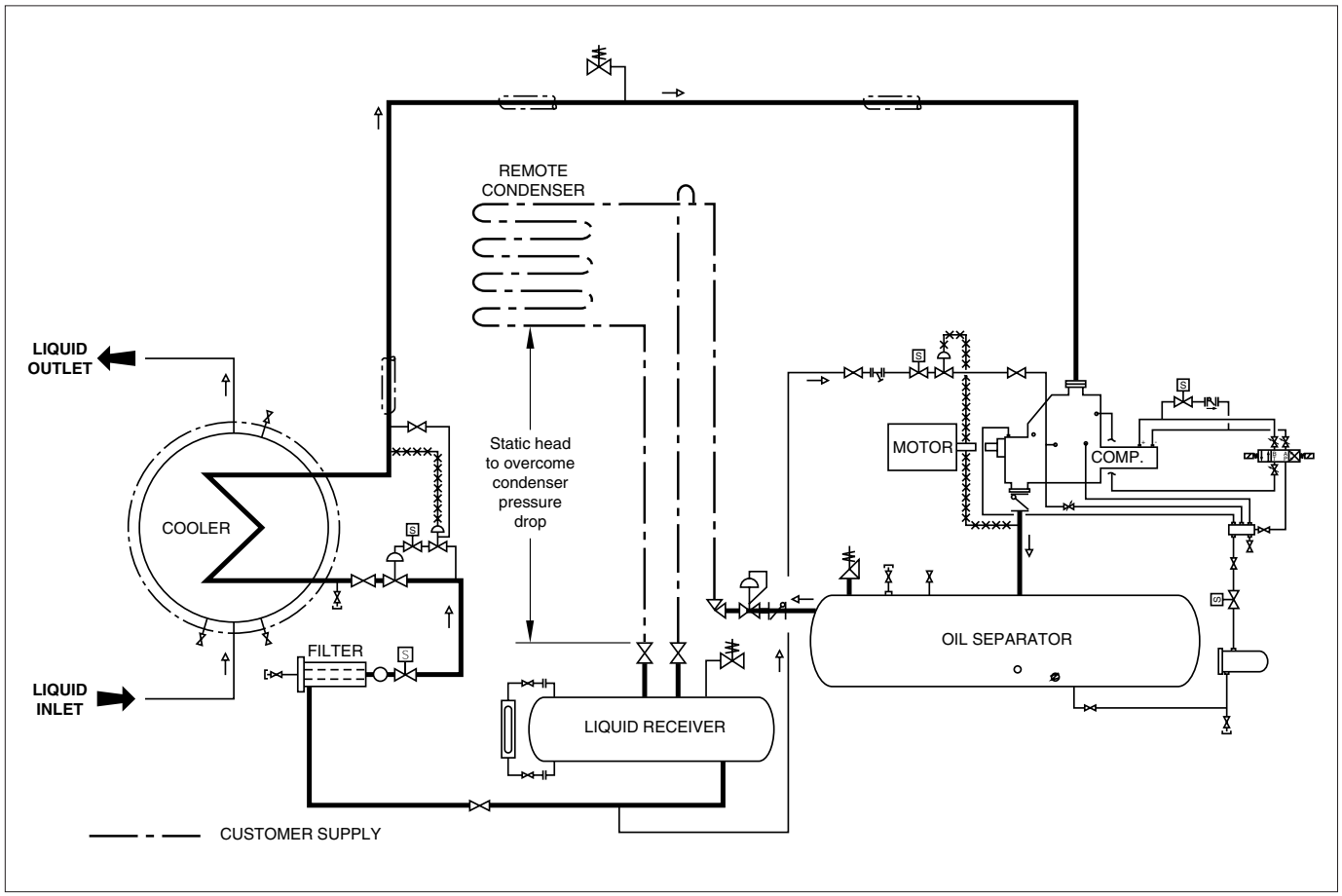
Remote Condensers
Where a chiller is used in conjunction with a remote condenser, the condenser should be located as close to the chiller as possible. This will minimize refrigerant piping pressure drop. Adequate subcooling must be provided to assure liquid refrigerant at the thermal expansion valve in a sub-cooled state. A relief valve must be installed in accordance with the applicable local codes.

The condenser must be located high enough above the liquid receiver to achieve liquid draining of the condenser.

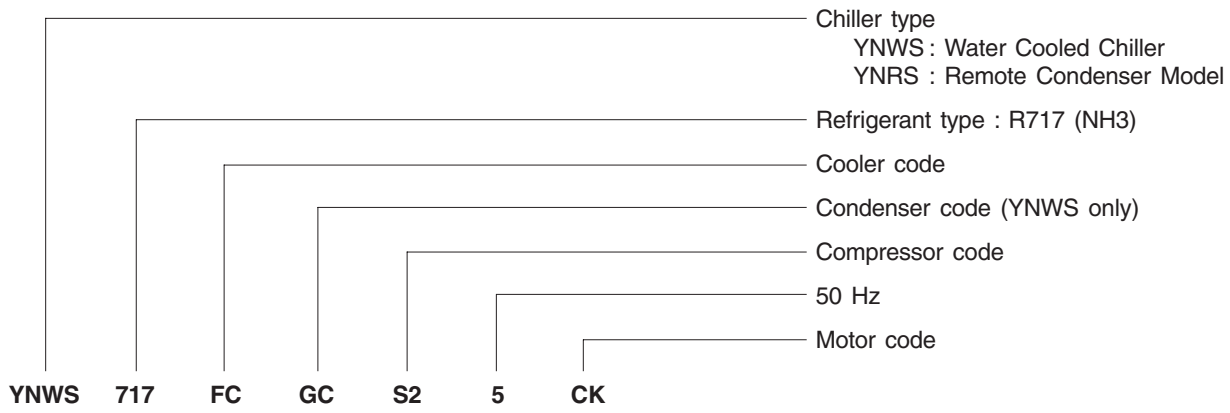
YNWS REFRIGERANT FLOW DIAGRAM FIGURE 6



YNRS REFRIGERANT FLOW DIAGRAM FIGURE 7



IDENTIFICATION



ELECTRICAL DATA

Motor Voltage
Low voltage motors (up to and including 400 volts) are supplied with six leads. High voltage (3300 volts) motors have three leads. Motor circuit conductor size must be in accordance with applicable codes, for the motor full load amperes (FLA). Flexible conduit should be used for the last meter or two to the chiller in order to provide vibration isolation. Table 1 lists the allowable variation in voltage supplied to the Millennium motor. The unit name plate is stamped with the specific motor voltage, and frequency for the appropriate motor.

Starters
The Millennium is available with a factory-mounted and wired YORK Solid State Starter for voltages up to 400 volts. Other types of remote mounted starters are available. These electro-mechanical starters must be supplied in accordance with YORK Standard Specifications. This will ensure that starter components, controls, circuits, and terminal markings will be proper for required overall system performance.

Controls
A 115 volt (220 volt for optional SIEMENS control panel), single phase, 50 Hertz power supply must be supplied to the chiller from a separate, fused disconnect or from a control transformer included as an option with electro-mechanical starters. No field control wiring is required when a YORK Solid State starter is supplied.

Copper Conductors
Only copper conductors should be connected to compressor motors and starters. Aluminium conductors have proven to be unsatisfactory when connected to copper lugs. Aluminium oxide and the difference in thermal conductivity between copper and aluminium cannot guarantee the required tight connection over a long period of time.

Capacitors
Capacitors can be applied to a YNWS for the purpose of power factor correction. For Star-Delta Closed-Transition and Across-the-Line starters, the capacitors should be located on the load side of the starter. For YORK Solid State Starters, the capacitors must be located on the line side of the starter. Capacitors are not recommended for use with star-delta Open-transition starters. The capacitors must be verified by YORK.

Compressor Motor Power Supply
Electrical power wire size to the Millennium is based on the minimum unit ampacity. For Solid State Starters, this wiring is done at the factory. For remote starters, the calculation of ampacity, is summarized below. More specific information on actual amperage ratings will be supplied with the submittal drawings.

- Six-lead type of starting (Star-delta)
  Minimum circuit ampacity per conductor (1 of 6):
  Ampacity = .721 x compressor motor amps.
- Three-lead type starting (Across-the-Line, Autotransformer and Primary reactor)
  Minimum circuit ampacity per conductor (1 of 3):
  Ampacity = 1.25 x compressor motor amps.

Fused Disconnect Switch
The fused disconnect switch for the compressor motor starter must be sized in accordance with the applicable code.
Below 415 volts, the formula generally is:
Amp rating = 115% x amps of all loads on the circuit.
This would include compressor motor, and may include control transformer. Refer to submittal drawings for specific calculations for each application.

Ampacity on Line Side of Starter
Min. Circuit Ampacity
= 125% of compressor motor amps (FLA) + all other loads on the circuit
The only additional load on the circuit for the Millennium would be the control transformer, unless they are supplied by a separate source.

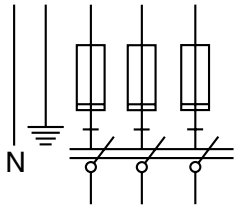
Branch Circuit Overcurrent Protection
The branch circuit overcurrent protection device(s) should be a time delay type, with a minimum rating equal to the next standard fuse/breaker rating above the calculated value. It is calculated taking into account the compressor motor amps and may also include control transformer. Refer to submittal drawings for the specific calculations for each application.

TABLE 2 **MOTOR VOLTAGE FACTORS**

FREQ.	RATED VOLTAGE	NAMEPLATE VOLTAGE	OPERATING VOLTAGE	
			MIN.	MAX.
50 Hz	346	346	311	381
	380	380/415	342	423
	415	415	374	440
	3300	3300	2970	3630

ISN MICRO PANEL CONNECTIONS

POWER CONNECTIONS



3N ~ 50 Hz
400V
or
330V

TB2

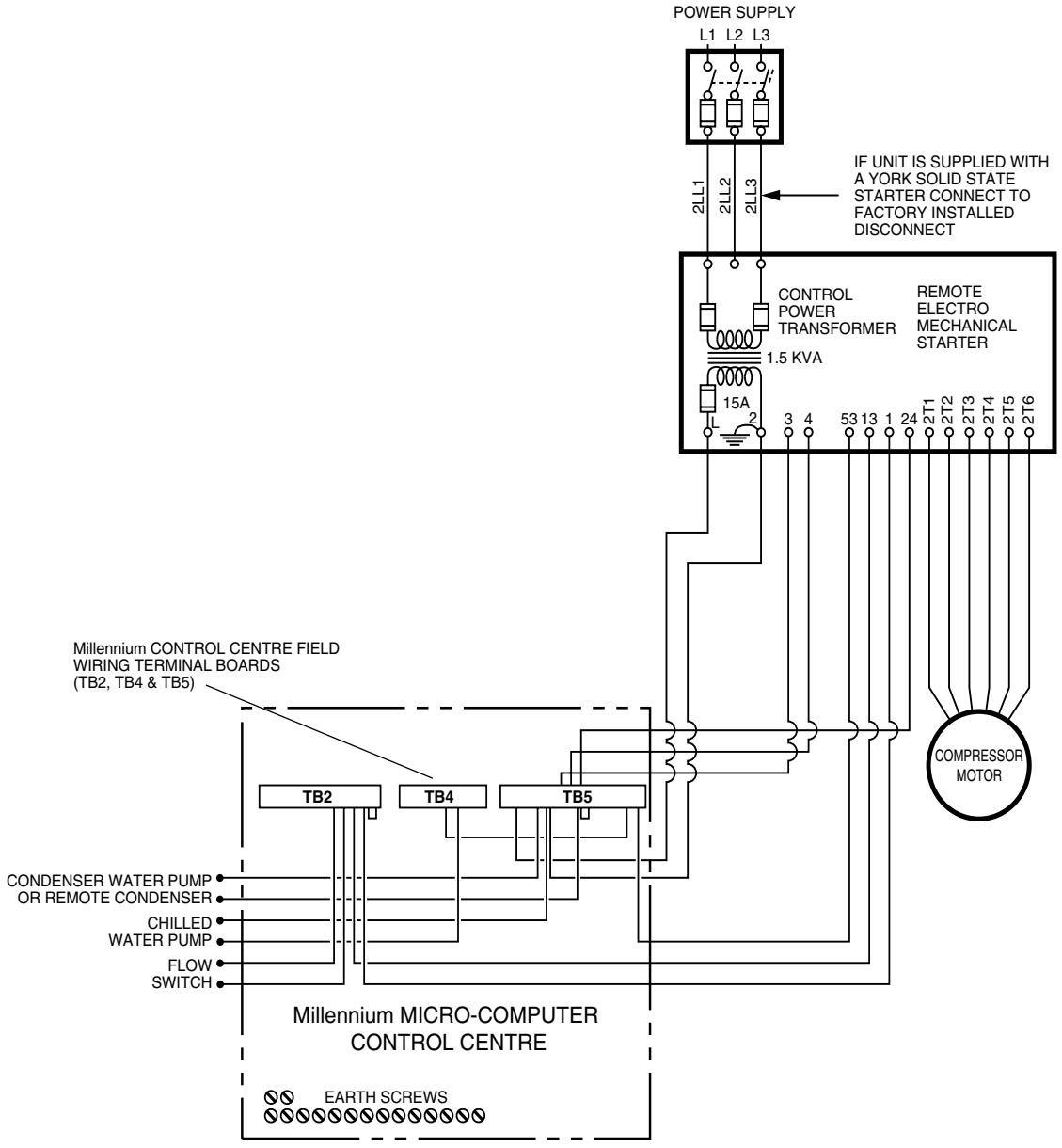
7	START
1	REMOTE START / STOP FROM BMS OR PUSH BUTTON
8	STOP
19	REMOTE LWT RESET
1	CONNECT TO OPTIONAL PCB's
20	REMOTE CURRENT RESET
1	CHILLED WATER FLOW SWITCH
12	
13	LOCAL REMOTE START / STOP
1	MULTI UNIT SEQUENCE START / STOP
9	

TB4

40	CYCLING SHUT-DOWN INDICATION
41	
42	SAFETY SHUT-DOWN INDICATION
43	
44	CHILLED WATER PUMP START / STOP
45	
26	REMOTE MODE READY TO START INDICATION
27	

TB5

L	
L	
L	
2	CONDENSER WATER PUMP OR REMOTE CONDENSER START / STOP
2	
3	
4	
24	
25	
35	*Millennium* RUN INDICATION
36	
1	ELECTRO-MECHANICAL STARTER
53	MANUAL RESET OVERLOADS



OPERATING LIMITATIONS

SECONDARY FLUID QUALITY

The cooler and condenser are designed for use with noncorrosive water. Water and glycol brine analysis is essential in protecting system heat exchangers. Analyses prior to start-up will prevent corrosion. When the system has been turned over to the owner, the latter should take such steps as will ensure the continued protection of the heat exchangers.
YORK recommends the use of local water treatment company.

SECONDARY FLUID SYSTEM

R717 (NH3) and copper are incompatible. Whenever copper is in the secondary system, pH levels must be monitored on a permanent basis using an electrometric pH meter that will alert to the presence of ammonia.

Recommendations for maintenance

It is good practice to have the system analysed first and the water analysed on a periodical basis by a water conditioning engineer. A minimum protective measure is to periodically check system water pH content, which should be between 7 and 8. Any other pH levels will immediately cause corrosion. Checking system water pH levels, in addition, is an excellent way of monitoring ammonia (NH3) leakage.

TABLE 3 TEMPERATURE RANGE

	MIN.	MAX.
Leaving chilled water temperature °C	4	12
Leaving glycol temperature °C	-10	12
YNWS leaving condenser water temperature °C	20	Note 1
YNRS condensing temperature °C	20	50
Entering condenser water temperature above leaving chilled liquid temperature (YNWS)	6	

Nota 1 : 45°C of LCWT or 50°C of condensing temperature.

COMPRESSOR

- Maximum condensing saturation temperature : 50°C
  For condensing temperature above 50°C consult our Technical Departments.
- Maximum discharge temperature : +100°C
- Nominal discharge temperature : +65°C
  The discharge temperature should always be at least 15°C over the saturated condensing temperature.

CONDENSER (YNWS only) AND COOLER

Maximum waterside operating pressure : 10 barg
Maximum water and brine pressure drop : 100 kPa

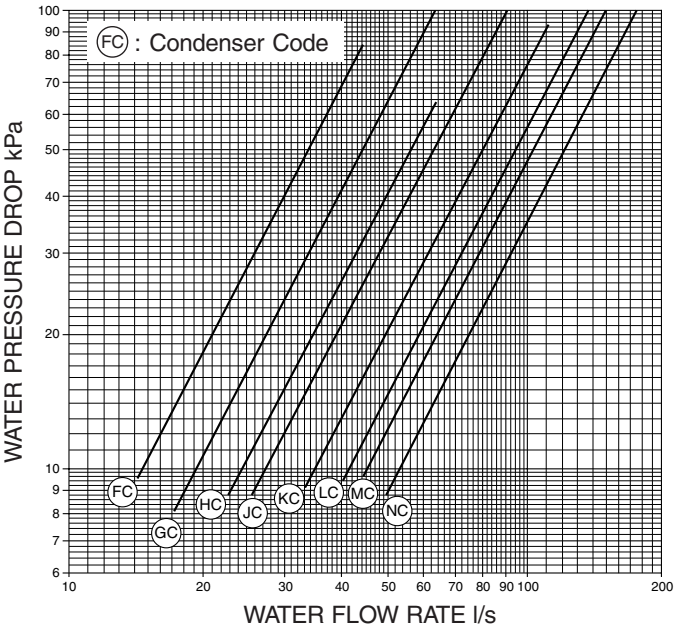
The chart below describes the pressure drop for your nominal flow (pressure drop are given with a tolerance of ± 20%) and standard range of YNWS and YNRS. Lower pressure drop or higher flow rate and more accurate calculation can be achieved (contact York Engineering Department).

YNWS and YNRS 717 chillers with steel tube coolers should be installed in closed systems only.

TABLE 4 CONDENSER 3 PASS FLOW LIMITATIONS

MODEL	MIN.		MAX.	
	(m^3/h)	(l/s)	(m^3/h)	(l/s)
FC	51	14	159	44
GC	62	17	228	63
HC	82	23	228	63
JC	92	26	350	97
KC	119	33	397	110
LC	144	40	528	147
MC	159	44	577	160
NC	179	50	635	176

FIGURE 8 CONDENSER 3 PASS PRESSURE DROPS



OPERATING LIMITATIONS (Continued)

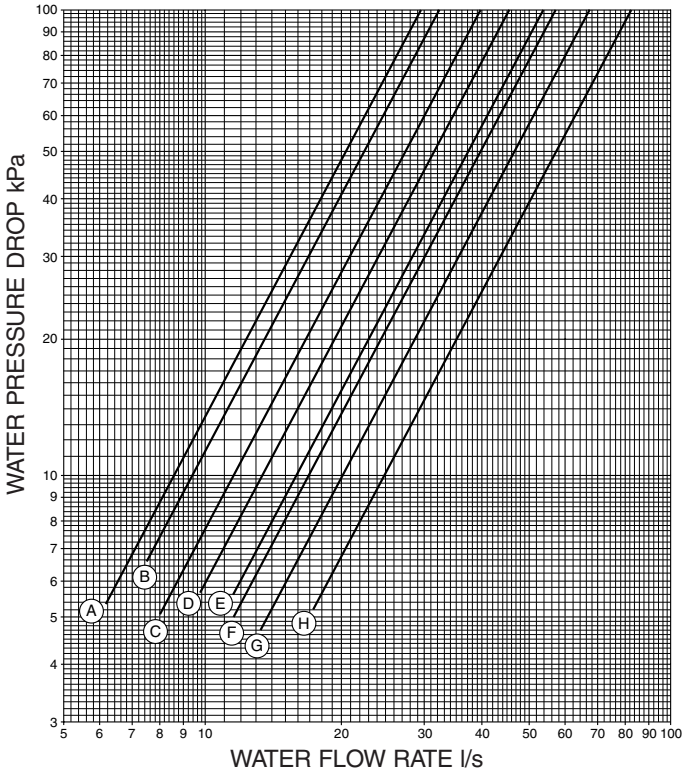
COOLER - WATER COOLING APPLICATION

CHILLED WATER FLOW LIMITATIONS — TABLE 5

MODEL	MIN.		MAX.	
	(m^3/h)	(l/s)	(m^3/h)	(l/s)
DC	14,6	4	145	40
EC	19,6	5	190	53
FC	25,9	7	230	64
FB	25,9	7	284	79
GC	36	10	296	82
GB	36	10	325	90

COOLER PRESSURE DROPS — FIGURE 9

Water application



CHILLER MODEL	LINE	CHILLER MODEL	LINE
YNWS 717 DC .. S0	(A)	YNWS 717 EC .. S3	(E)
YNWS 717 EC .. S0	(B)	YNWS 717 FC .. S3	(G)
YNWS 717 DC .. S1	(C)	YNWS 717 FC .. S4	(G)
YNWS 717 EC .. S1	(D)	YNWS 717 GC .. S4	(H)
YNWS 717 EC .. S2	(D)	YNWS 717 FC .. S5	(G)
YNWS 717 FC .. S2	(F)	YNWS 717 GC .. S5	(H)

COOLER - BRINE COOLING APPLICATION

Maximum waterside operating pressure : 10 barg

- All units are designed for a maximum nominal pressure drop of 100 kPa. The pressure drop tolerances depend on the application. For any warranty on this value, see the tolerances in the YF selection software or consult York.
- The maximum flow of the secondary fluid is a function of the number of baffles in the cooler. This number of baffles is calculated to keep 100 kPa maximum pressure drop and is a function of your nominal flow. For your unit the maximum flow is 10% over the nominal flow of the contract selection. The minimum flow is 20% lower than the nominal flow.
- The number of the baffles could be designed by the YF selection software to keep the pressure drop you want, function of your nominal flow and the percentage of brine.

TABLE 6 REFRIGERANT CHARGE (1)

YNWS MODEL					R717 CHARGE (kg)
YNWS	717	DC	FC	S0	28
YNWS	717	DC	GC	S0	32
YNWS	717	EC	FC	S0	29
YNWS	717	EC	GC	S0	32
YNWS	717	DC	FC	S1	28
YNWS	717	DC	GC	S1	32
YNWS	717	EC	FC	S1	29
YNWS	717	EC	GC	S1	32
YNWS	717	EC	GC	S2	32
YNWS	717	EC	HC	S2	37
YNWS	717	EC	JC	S2	41
YNWS	717	FC	GC	S2	33
YNWS	717	FC	HC	S2	38
YNWS	717	FC	JC	S2	42
YNWS	717	EC	HC	S3	37
YNWS	717	EC	JC	S3	41
YNWS	717	EC	KC	S3	48
YNWS	717	FC	HC	S3	38
YNWS	717	FC	JC	S3	41
YNWS	717	FC	KC	S3	49
YNWS	717	FB/FC	KC	S4	54
YNWS	717	FB/FC	LC	S4	59
YNWS	717	FB/FC	MC	S4	64
YNWS	717	FB/FC	NC	S4	71
YNWS	717	GB/GC	KC	S4	54
YNWS	717	GB/GC	LC	S4	60
YNWS	717	GB/GC	MC	S4	65
YNWS	717	GB/GC	NC	S4	72
YNWS	717	FB/FC	LC	S5	59
YNWS	717	FB/FC	MC	S5	64
YNWS	717	FB/FC	NC	S5	71
YNWS	717	GB/GC	LC	S5	60
YNWS	717	GB/GC	MC	S5	65
YNWS	717	GB/GC	NC	S5	72

YNRS MODEL				R717 CHARGE (kg) Without Condenser and Liquid Line
YNRS	717	DC	S0	24
YNRS	717	EC	S0	24
YNRS	717	DC	S1	24
YNRS	717	EC	S1	24
YNRS	717	EC	S2	30
YNRS	717	FC	S2	31
YNRS	717	EC	S3	30
YNRS	717	FC	S3	31
YNRS	717	FB/FC	S4	38
YNRS	717	GB/GC	S4	39
YNRS	717	FB/FC	S5	38
YNRS	717	GB/GC	S5	39

(1) The refrigerant charge depends on the leaving chilled water temperature. The charge is given at +6°C leaving chilled water temperature.

TABLE 6 OIL CHARGE

Compressor Code	CHARGE (l)
S0, S1, S2, S3	57
S4, S5	75

REMOTE CONDENSER INSTALLATION

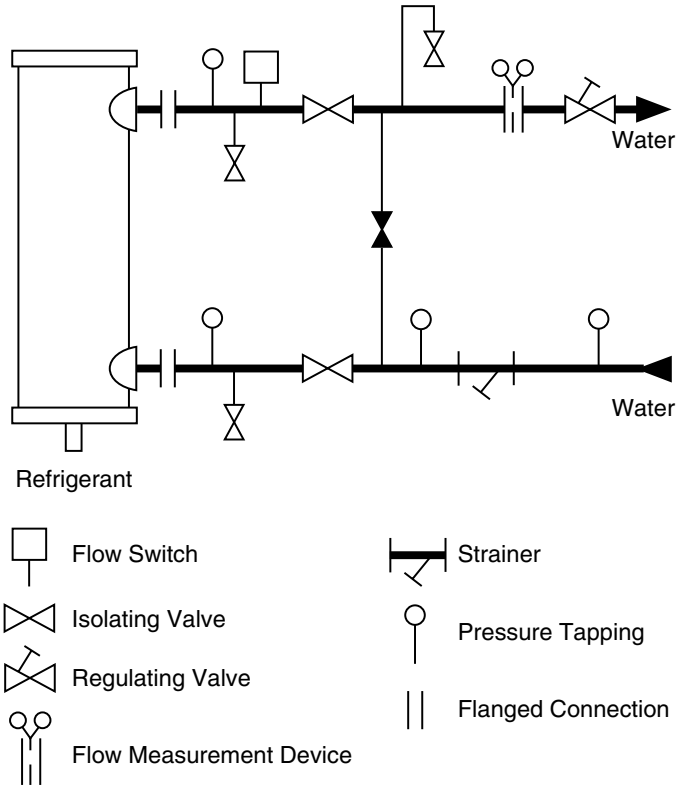
The customer must supply and install the remote condenser with consideration given to the following :

1 - The remote condenser should be in close proximity to the unit to minimize piping pressure drop.
2 - The height of the remote condenser above liquid receiver must be large enough to overcome condenser and piping pressure drop at full load.

TABLE 7 COOLER AND CONDENSER WATER CAPACITIES

Cooler Type	Cooler Water Capacity (liters)	Condenser Type	Condenser Water Capacity (liters)
DC	235	FC	140
EC	370	GC	185
FB	550	HC	240
FC	535	JC	275
GB	705	KC	350
GC	680	LC	425
		MC	465
		NC	555

RECOMMENDED COOLER/CONDENSER PIPEWORK ARRANGEMENT



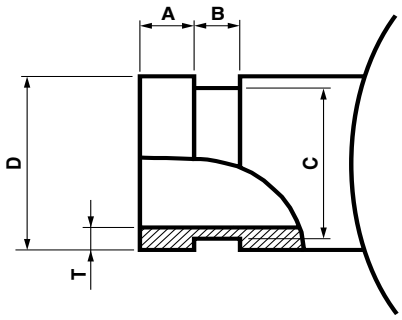
CONNECTION TYPES & SIZES

For nominal connection sizes for individual models of chiller, see DC and DE in Dimensions Section.

Connections

Standard chilled liquid connections on all coolers and condensers are of the Victaulic Groove type. Optionally, flanges may be fitted. Dimensions are as follows :

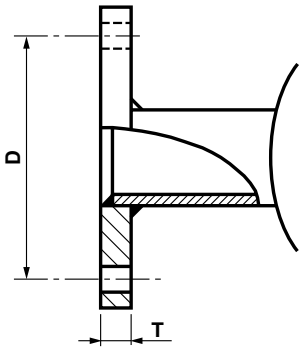
Standard Victaulic :



Nom. Size	D	T	A	B	C
DN 100	114.3	3.6-6.3	15.9	9.5	110.1
DN 125	141.3	6.3-4.0	15.9	9.5	137.0
DN 150	168.3	4.5-7.1	15.9	9.5	164.0
DN 200	219.1	6.3-8.0	19.0	11.1	214.4
DN 250	273.0	8.0	19.0	12.7	268.3
DN 300	323.9	8.0	19.0	12.7	318.3

Dimensions in mm

Optional Flanges

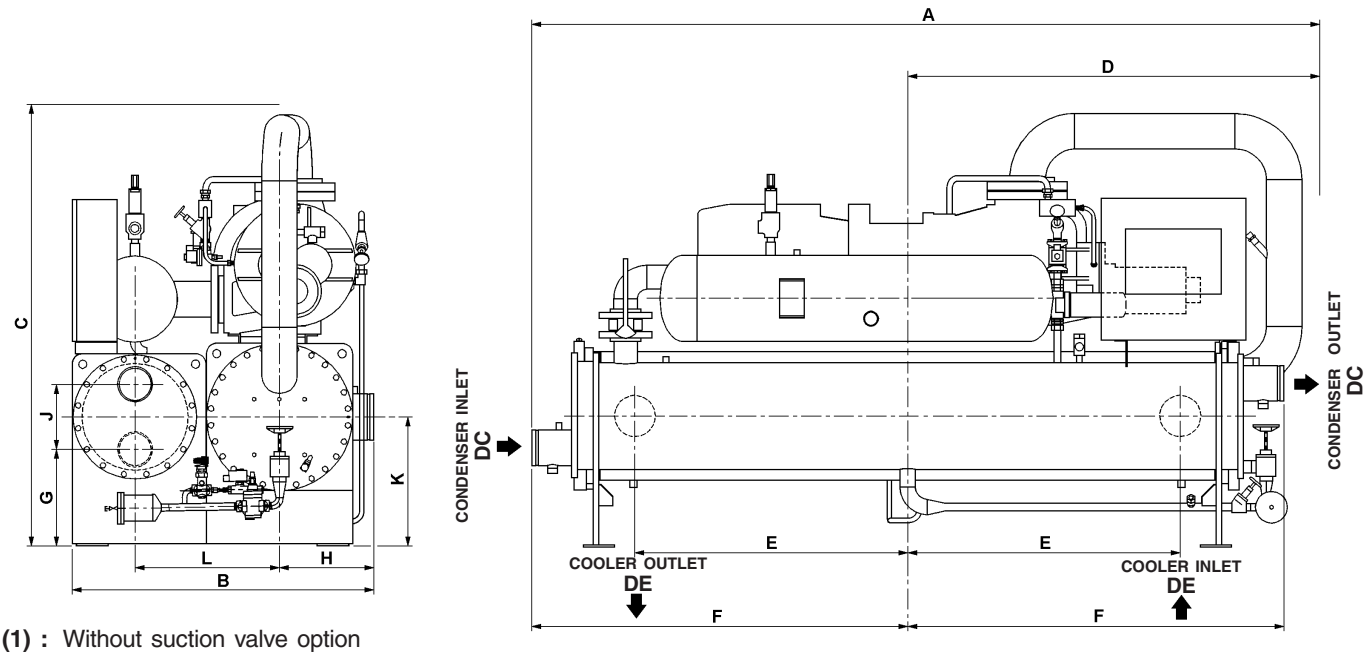


PN 10 WELD FLANGE

Nom. Size	D	T	Bolts
DN 100	180	22	8 x M16
DN 125	210	24	8 x M16
DN 150	240	24	8 x M20
DN 200	295	26	8 x M20
DN 250	350	28	12 x M20
DN 300	400	28	12 x M20

Dimensions in mm

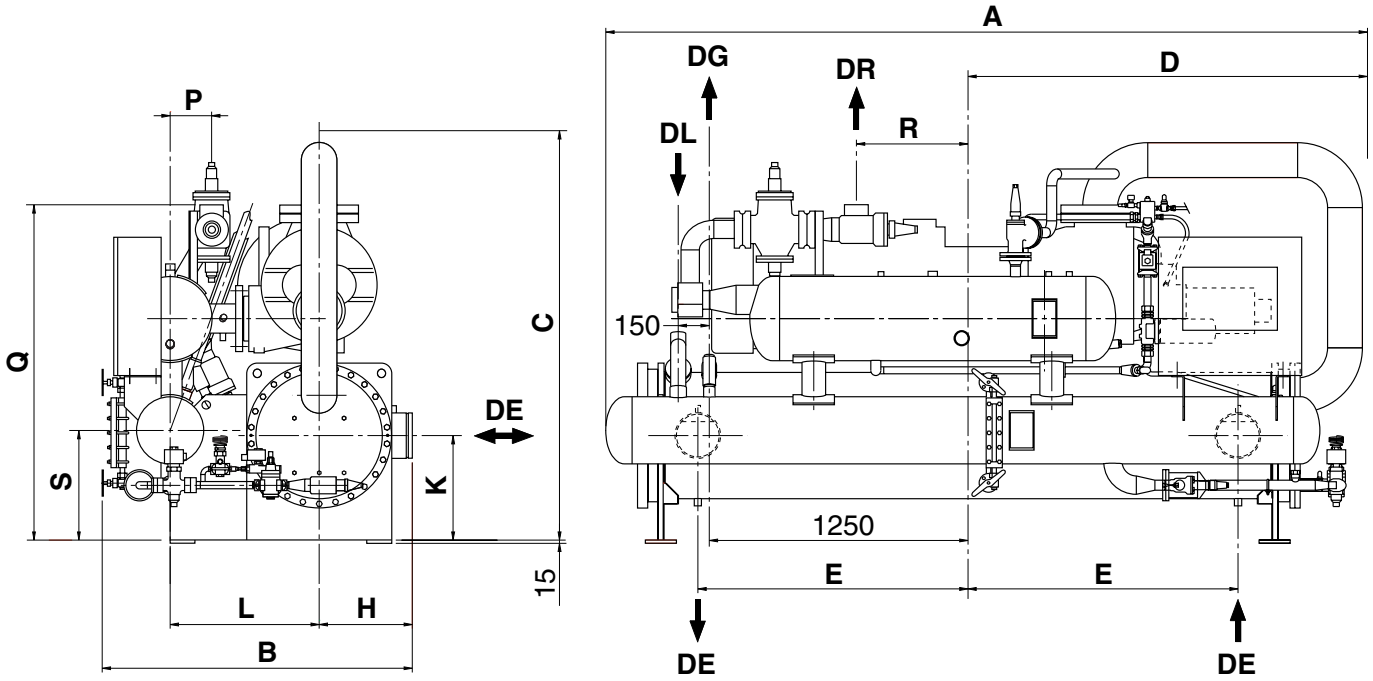
YNWS DIMENSIONS AND WEIGHT



(1) : Without suction valve option
(2) : With suction valve option
(3) : For high voltage motor option, please contact factory.
Shipping height : add 150 mm for shipping skid option.

Model YNWS	A (mm)	B (mm)	(1) (3) C (mm)	(2) (3) C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	J (mm)	K (mm)	L (mm)	DC (DN)	DE (DN)	WEIGHT shipping (kg)	WEIGHT operating (kg)
YNWS 717 DC FC S0	3630	1325	1855	1840	1865	1300	1765	430	355	250	615	720	125	200	3589	4114
YNWS 717 DC GC S0	3640	1350	1855	1840	1865	1300	1775	395	355	270	615	720	150	200	3759	4334
YNWS 717 EC FC S0	3630	1375	1855	1840	1865	1275	1765	430	405	250	565	720	125	250	4109	4754
YNWS 717 EC GC S0	3640	1400	1855	1840	1865	1275	1775	395	405	270	565	720	150	250	4279	4974
YNWS 717 DC FC S1	3640	1325	1855	1840	1875	1300	1765	430	355	250	615	720	125	200	3616	4150
YNWS 717 DC GC S1	3650	1350	1855	1840	1875	1300	1775	395	355	270	615	720	150	200	3786	4370
YNWS 717 EC FC S1	3640	1375	1855	1840	1875	1275	1765	430	405	250	565	720	125	250	4136	4790
YNWS 717 EC GC S1	3650	1400	1855	1840	1875	1275	1775	395	405	270	565	720	150	250	4306	5010
YNWS 717 EC GC S2	3705	1400	1970	1950	1930	1275	1775	395	405	240	565	720	150	250	4730	5449
YNWS 717 EC HC S2	3720	1425	1975	1955	1930	1275	1790	350	405	310	565	720	150	250	4900	5674
YNWS 717 EC JC S2	3725	1450	2125	2105	1930	1275	1795	480	405	310	710	720	200	250	5005	5844
YNWS 717 FC GC S2	3705	1445	1985	1965	1930	1245	1775	395	450	270	505	720	150	300	5400	6274
YNWS 717 FC HC S2	3720	1470	1975	1955	1930	1245	1790	350	450	310	505	720	150	300	5570	6499
YNWS 717 FC JC S2	3725	1495	2125	2105	1930	1245	1795	480	450	310	660	720	200	300	5675	6669
YNWS 717 EC HC S3	3735	1425	1975	1955	1945	1275	1790	350	405	310	565	720	150	250	5226	6010
YNWS 717 EC JC S3	3740	1450	2125	2105	1945	1275	1795	480	405	310	710	720	200	250	5331	6180
YNWS 717 EC KC S3	3750	1480	2120	2100	1945	1275	1805	420	405	370	710	720	200	250	5576	6510
YNWS 717 FC HC S3	3760	1470	1975	1955	1970	1245	1790	350	450	310	505	720	150	300	5896	6835
YNWS 717 FC JC S3	3765	1495	2125	2105	1970	1245	1795	480	450	310	660	720	200	300	6001	7005
YNWS 717 FC KC S3	3775	1525	2120	2100	1970	1245	1805	420	450	370	660	720	200	300	6246	7335
YNWS 717 F - KC S4	3865	1640	2325	2335	2060	1245	1805	430	450	370	685	835	200	300	7259	8412
YNWS 717 F - LC S4	3875	1660	2320	2330	2060	1245	1815	420	450	350	685	835	250	300	7524	8707
YNWS 717 F - MC S4	3875	1685	2460	2470	2060	1245	1815	510	450	400	825	835	250	300	7784	9077
YNWS 717 F - NC S4	3890	1715	2460	2470	2060	1245	1830	470	450	430	825	835	250	300	8129	9507
YNWS 717 G - KC S4	3865	1690	2325	2335	2060	1240	1805	430	500	370	640	835	200	300	7724	9047
YNWS 717 G - LC S4	3875	1710	2320	2330	2060	1240	1815	420	500	350	640	835	250	300	7989	9342
YNWS 717 G - MC S4	3875	1735	2435	2445	2060	1240	1815	510	500	400	780	835	250	300	8249	9712
YNWS 717 G - NC S4	3890	1765	2460	2470	2060	1240	1830	470	500	430	780	835	250	300	8594	10142
YNWS 717 F - LC S5	3870	1660	2320	2330	2055	1245	1815	420	450	350	685	835	250	300	8446	9635
YNWS 717 F - MC S5	3870	1685	2460	2470	2055	1245	1815	510	450	400	825	835	250	300	8706	10005
YNWS 717 F - NC S5	3885	1715	2460	2470	2055	1245	1830	470	450	430	825	835	250	300	9051	10435
YNWS 717 G - LC S5	3890	1710	2320	2330	2075	1240	1815	420	500	350	640	835	250	300	8911	10270
YNWS 717 G - MC S5	3890	1735	2460	2470	2075	1240	1815	510	500	400	780	835	250	300	9171	10640
YNWS 717 G - NC S5	3905	1765	2460	2470	2075	1240	1830	470	500	430	780	835	250	300	9516	10950

YNRS DIMENSIONS AND WEIGHT



DE : COOLER WATER INLET AND OUTLET
DG : RECEIVER EQUALIZING
DL : CONDENSER LIQUID
DR : CONDENSER GAS

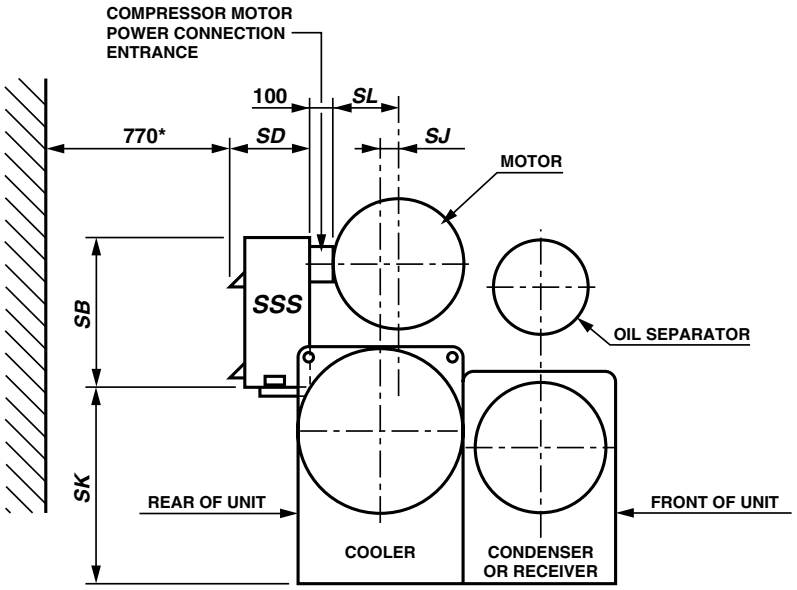
(1) : Without suction valve option
(2) : With suction valve option
(3) : For high voltage motor option, please contact factory.
Shipping height : add 150 mm for shipping skid option.

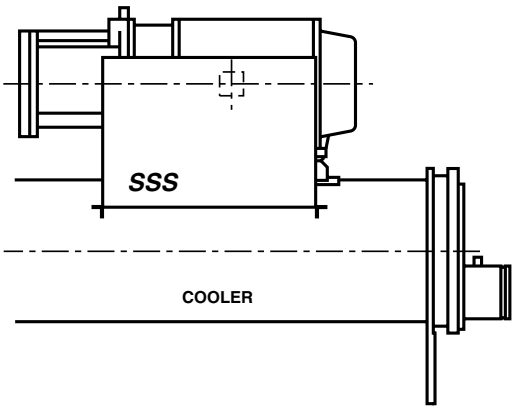
Model YNRS	A (mm)	B (mm)	(1) (3) C (mm)	(2) (3) C (mm)	D (mm)	E (mm)	H (mm)	K (mm)	L (mm)	P (mm)	Q (mm)	R (mm)	S (mm)	T (mm)	DR (DN)	DL (DN)	DG (DN)	DE (DN)	WEIGHT shipping (kg)	WEIGHT operating (kg)
YNRS 717 DC S0	3615	1430	1855	1840	1865	1300	355	615	720	200	1545	665	555	457	80	50	32	200	3090	3410
YNRS 717 EC S0	3615	1430	1855	1840	1865	1275	405	565	720	200	1545	665	555	457	80	50	32	250	3610	4050
YNRS 717 DC S1	3625	1430	1855	1840	1875	1300	355	615	720	200	1545	665	555	457	80	50	32	200	3120	3440
YNRS 717 EC S1	3625	1430	1855	1840	1875	1275	405	565	720	200	1545	665	555	457	80	50	32	250	3640	4080
YNRS 717 EC S2	3680	1400	1970	1950	1930	1275	405	565	720	200	1620	540	530	482	100	65	40	250	4100	4550
YNRS 717 FC S2	3680	1400	1985	1965	1930	1245	450	505	720	200	1620	540	530	482	100	65	40	300	4770	5370
YNRS 717 EC S3	3695	1400	1975	1955	1945	1275	405	565	720	200	1620	540	530	482	100	65	40	250	4420	4870
YNRS 717 FC S3	3720	1400	1975	1955	1970	1245	450	505	720	200	1620	540	530	482	100	65	40	300	5090	5690
YNRS 717 FC S4	3810	1580	2325	2335	2060	1245	450	685	835	350	1890	405	605	498	125	80	50	300	6200	6870
YNRS 717 FB S4	3810	1580	2325	2335	2060	1245	450	685	835	350	1890	405	605	498	125	80	50	300	6120	6760
YNRS 717 GC S4	3810	1580	2325	2335	2060	1240	500	640	835	195	1770	430	605	498	125	80	50	300	6640	7460
YNRS 717 GB S4	3810	1580	2325	2335	2060	1240	500	640	835	195	1770	430	605	498	125	80	50	300/350	6590	7390
YNRS 717 FC S5	3805	1580	2320	2330	2055	1245	450	685	835	350	1890	405	605	498	125	80	50	300	7130	7800
YNRS 717 FB S5	3805	1580	2320	2330	2055	1245	450	825	835	350	1890	405	605	498	125	80	50	300/350	7040	7680
YNRS 717 GC S5	3805	1580	2320	2330	2075	1240	500	640	835	195	1770	430	605	498	125	80	50	300	7570	8390
YNRS 717 GB S5	3805	1580	2320	2330	2075	1240	500	780	835	195	1770	430	605	498	125	80	50	300/350	7510	8310

SOLID STATE STARTER (OPTIONAL)

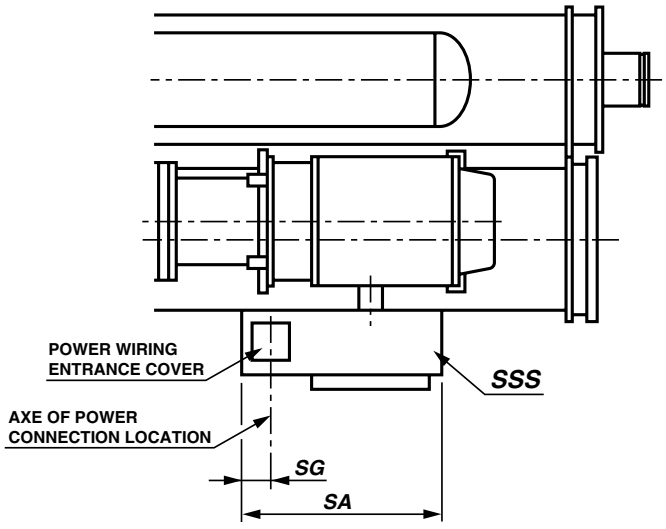
SELECTION TABLE

MOTOR CODE		5CC	5CD	5CE	5CF	5CG	5CH	5CI	5CJ	5CK	5CL	5CM	5CN	5CO	5CP	5CQ	5CR	5CS	5CT	5CU
MOTOR VOLTAGE	380	7L		14LA				14LB			26LA			26LB		26LC		33L		
	415	7L			14LA				14LB			26LA			26LB		26LC		33L	





*** Required service clearance**



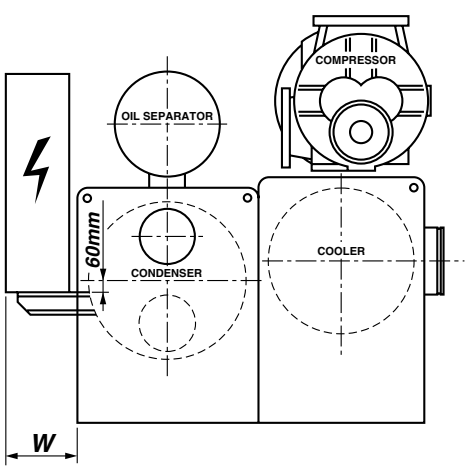
MOTOR CODE	SL
5CC thru 5CK	310
5CL thru 5CS	350
5CS thru 5CU	410

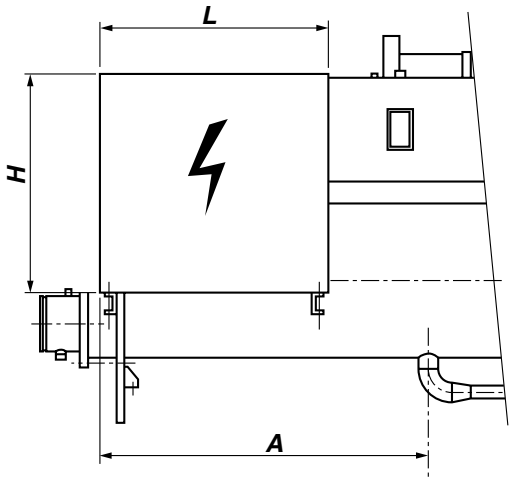
SOLID STATE STARTER MODEL	7 L thru 14 LB	26 L thru 33 L
SA (mm)	864	889
SB (mm)	556	645
SD (mm)	335	425
SG (mm)	138	151
Weight (kg)	91	136

COMPRESSOR CODE	COOLER CODE	SK (mm)		SJ (mm)
		7L thru 14LB	26L thru 33L	
S0, S1	DC	336	249	64
	EC	442	355	64
S2, S3	EC	222	135	76
	FC	262	175	76
S4, S5	FB/FC	280	193	0
	GB/GC	681	594	0

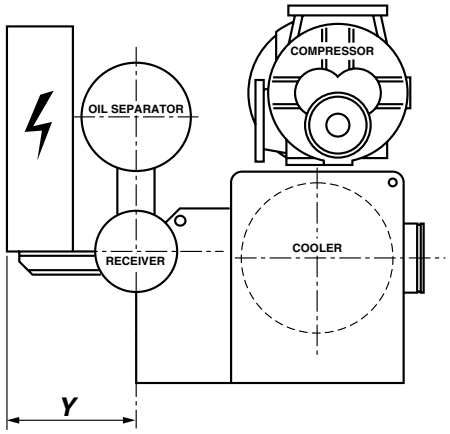
STARTER PANEL (OPTIONAL)

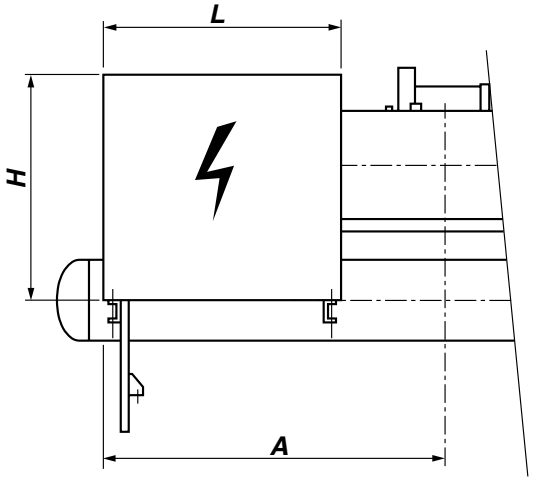
YNWS





YNRS





DIRECT STARTER PANEL

POWER (kW)	L (mm)	W (mm)	Y (mm)	H (mm)	A (mm)
75	660	340	660	800	1578
90	660	340	660	800	1578
110	860	340	660	1000	1578
132	860	340	660	1100	1578
160	860	340	660	1100	1578
200	1060	340	660	1100	1578
250	1060	340	660	1100	1578
315	1060	340	660	1100	1578
355	1060	340	660	1100	1578
400	1260	440	760	1500	1578
450	1260	440	760	1500	1578
500	1260	440	760	1500	1578
550	1260	440	760	1500	1578

STAR / DELTA STARTER PANEL

POWER (kW)	L (mm)	W (mm)	Y (mm)	H (mm)	A (mm)
75	860	340	660	800	1578
90	860	340	660	800	1578
110	1060	340	660	1000	1578
132	1060	340	660	1100	1578
160	1260	340	660	1100	1578
200	1260	340	660	1100	1578
250	1260	340	660	1100	1578
315	1260	340	660	1100	1578
355	1260	340	660	1100	1578
400	1260	440	760	1500	1578
450	1260	440	760	1500	1578
500	1460	440	760	1500	1578
550	1460	440	760	1500	1578

SOFT STARTER PANEL

POWER (kW)	L (mm)	W (mm)	Y (mm)	H (mm)	A (mm)
75	1460	480	800	1000	1578
90	1460	480	800	1000	1578
110	1460	480	800	1000	1578
132	1460	480	800	1000	1578
160	1660	480	800	1200	1778
200	1660	480	800	1200	1778
250	1660	480	800	1200	1778
315	1660	480	800	1200	1778
355	1660	480	800	1200	1778
400	1660	480	800	1500	1778
450	1660	480	800	1500	1778
500	1660	480	800	1500	1778
550	1660	480	800	1500	1778

NOTES